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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,184	08/28/2003	Armin Schoisswohl	134362	6461

7590 06/15/2005

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EXAMINER	
JAWORSKI, FRANCIS J	
ART UNIT	**PAPER NUMBER**
3737	

DATE MAILED: 06/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/650,184	SCHOISSWOHL, ARMIN	
	Examiner	Art Unit	
	Jaworski Francis J.	3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *8/28/03 IDS10/20/03 PreAmdt*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *08/20/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson (US6673017) alone or further in view of Yamauchi (US6730032) or Pang et al (US6558325)...

Jackson (US6673017) is directed to increasing frame resolution for high frame rate (high temporal resolution) applications such myocardial strain imaging or cross-frame noise filtering by time-alignment using a first temporal indicator (termed a 'coarse' indicator such as ECG or other detectable event as a trigger to define a base physiologic cycle) and a second temporal indicator (termed a 'fine' indicator and including inter alia a velocity waveform obtained from the image) used to time correct the image frames for interleave combining, see col. 6 line 13 – col. 8 line 22. In a proposal col. 9 lines 29 – 36 an interleaved three-dimensional imaging application is suggested where one or more scan lines at fixed locations within the volume are used to provide information on the periodic movement of the subject .

In Jackson the trigger or coarse temporal indicator which identifies the overall time interval is stated to be the ECG trigger event or a visible or detectable cardiac

event, see col. 5 lines 21-35. Further, in the volume scan proposal of col. 9 the image motion data is used **either** to identify a time interval of the periodic movement in the volume **or** determine an alignment correction for the data in volume subsets associated with a cycle. Since Jackson is committed to using two temporal indicator types this passage falls short of anticipation when weighed against the applicant's claims 1 or 17 which require steps/structure for accomplishing both base time interval identification and time interval adjustment correction from volumetric scan data (since the col. 5 passage embraces non-image-based e.g phonocardiogram or ballistogram trigger detection.). However the artisan, when confronted with the col. 9 information that for volumetric scanning the motion periodicity data derived from the scan volume is capable of providing both the time-interval identifying data and the time-correction offset and the col. 5 instruction that the trigger or coarse indicator may be of mitral valve motion or motion associated with ventricular contraction, would recognize as obvious the tracking of valve or ventricle motion from the scan volume data.

In the alternative, **Yamauchi** (US6730032) like Jackson in its col. 9 alternative is directed to an ultrasound cardiac volume measurement process in which the volume measurement derives from image frame data of two types, i.e. from both a two chamber and four chamber view over successive heart cycles (Fig. 5A – 5B) which data must be time-aligned in spite of variation of periodic heart movement over the cardiac cycles as shown in Fig. 7A. In Yamauchi the alignment is caused to occur by a process in which each frame is first time stamped (Fig. 5C) and an average heart cycle length is also computed. Yamauchi is a volumetric scan in the sense of a two-view

(orthogonal view) system but does not in and of itself analyze the periodic movement of the heart to derive its normalization correction and time stamp adjustment. It does however in col. 10 lines 25-39 teach a simple normalizing process (compute the average physiologic cycle periodicity and then normalize individual cycle frame subsets thereto) by which the periodic motion signal (here the ECG) can be used for both the base trigger interval identification and the individual heart cycle length adjustment correction soas to provide exact time alignment between image frames of two differing times for compositing a volume calculation. Therefore the artisan when having both Jackson and Yamauchi would recognize that a single periodicity signal could provide both the interval identification and analysis-based correction for varying such intervals.

In the alternative still, **Pang et al** (US6558325) evidences that it was known to use image frame data in 3D volume scan buildup to provide both the peaks and distribution for a cardiac cycle curve, i.e. both the trigger or base cycle interval definition and an irregularity definition such that, whereas in Pang et al the 'correction' is typically adding/deleting frames Pang et al note that interpolation among existing frames is also possible col. 8 lines 53-63, bringing this reference to compatibility for supplanting the teaching of Jackson.

In the case of claim 8 this argument extends in all cases to intensity-based waveform comparisons in light of Jackson col. 6 lines 43-65

Iinuma (US5551434) is directed in figs. 17-20 and col. 14 bottom –col. 16 line 55 to time- aligning tomographic image frame data and Doppler flow packet data relative to

the time stamp of individual scanlines in the image frame sweep and therefore its time-alignment correction is independent of cyclic movement.

Ustuner et al (US6780152) col. 11 lines 1-21 uses dopopler flow or energy from the acoustic data for volumetric scan data frame alignment.

Urbano et al (US5976088) uses varying QRS trigger rates to change time intervals between frame acquisitions according to a lookup table or multiplier factor, see col.17-18.

Clark (US6139500) accommodates physiologic cycle variations by time-rescaling during scan conversion, see col. 10 lines 25-43.

Any inquiry concerning this communication should be directed to Jaworski Francis J. at telephone number 571-272-4738.

FJJ:fjj

06082005

Francis J. Jaworski
Primary Examiner